

Application No.: 10/074,792
Amendment Dated: August 5, 2004
Reply to Final Office Action of: May 12, 2004

MAT-6660US2

Remarks/Arguments:

The present invention includes a multilayer ceramic substrate that has a first conductive pattern that is transfer-printed on a ceramic substrate using an intaglio plate made of a flexible resin. The intaglio plate has a plurality of grooves with different depths. A first insulation layer is on the first conductive pattern, and a second conductive pattern is on the insulating layer. The two conductive patterns are coupled by a via.

By this Amendment, Applicants have amended claim 13. Claims 14, 22-28 and 30 have been cancelled. Claim 31 has been added. Claims 13, 15-21, 29 and 31 are pending.

Claims 13-30 were rejected under 35 U.S.C § 112, second paragraph. With regard to claim 13, Applicants have amended claim 13 to remove the phrase "said conductive material of said ceramic substrate being in contact with said via." With regard to claim 17, Applicants have amended claim 13 to remove the phrase "a through hole." In addition, Applicants have amended claim 13 to remove the phrase "conductive material." Withdrawal of the rejection is respectfully requested.

Claims 13-30 were rejected under 35 U.S.C § 103(a) as being unpatentable over Hayama et al. in view of Saito et al. It is respectfully submitted, however, that the claims are now patentable over the art of record for the reasons set forth below.

Hayama et al. discloses a ceramic substrate with a first and third conductive pattern having a convex via being formed on the ceramic substrate. An insulation layer is formed on the first and third conductive pattern and a second and fourth conductive pattern each electrically connected with the first and third conductive patterns by the via. Saito discloses a ceramic substrate provided with a through hole

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filled with an electroconductive substance and a via, The first and second conductive material are in contact with each other and disposed on the via.

Applicants' invention, as recited by claim 13 includes a feature which is neither disclosed nor suggested by the art of record, namely:

...a second conductive pattern electrically connected to said first conductive pattern by said via, said via embedded into said second conductive pattern.

The present invention includes a via which is embedded into the said second conductive pattern. This feature is found in the originally filed application in Figures 1, 9, and 10(e), where the via 11 is shown being embedded into the second conductive pattern 4. No new matter has been added.

Neither Hayama et al., Saito et al., nor their combination disclose or suggest a via being embedded into a conductive pattern. The embedded feature of the present application is different because the via which electrically connects one conductive pattern to another is not merely in contact with a conductive pattern. In addition to being in contact with a conductive pattern, the via is embedded into the conductive pattern.

The embedded feature has several advantages. With the embedded feature, a higher wiring density may be obtained as described in the originally filed application at page 13, lines 18-27. Further, the embedded feature increases the reliability of electrical connection between the via and the conductive pattern because the via extends above the surface of the insulation layer assuring contact with the conductive pattern. This increased reliability will result in fewer manufacturing errors and a greater lifetime. In addition the embedded junctions are less likely to become disconnected during operation from thermal cycling and mechanical vibrations.

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Accordingly, for the reasons set forth above, claim 13 is patentable over the art of record.

Claims 15-21, 29 and 31 include all the features of claim 13 from which they depend. Thus, claims 15-21, 29 and 31 are also patentable over the art of record for the reasons set forth above.

In view of the amendments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

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